AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An apparatus for detection of radiation comprising:

- a photocathode layer having a first surface ~~and being adapted~~ to release photoelectrons in dependence on incident radiation;

- a radiation entrance arranged such that a beam of radiation ~~can be entered~~ enters into the apparatus through said radiation entrance and ~~can~~ impinges on said photocathode layer at grazing incidence;

- an electron avalanche amplifier facing the first surface of said photocathode ~~and adapted~~ to avalanche amplify photoelectrons released from said photocathode layer; and

- a readout arrangement ~~adapted~~ to detect avalanche amplified electrons from said amplifier, wherein

- said radiation entrance is arranged so that the beam of radiation ~~can be entered~~ enters into the apparatus between said photocathode layer and said electron avalanche amplifier and ~~can~~ impinges onto the first surface of said photocathode; and

- said photocathode layer ~~is adapted to~~ releases photoelectrons from its first surface in response thereto.

2. (Cancelled)

3. (Cancelled)

4. (Original) The apparatus as claimed in Claim 1 wherein the photocathode layer is 0.00001-0.1 mm thick.

5. (Original) The apparatus as claimed in Claim 1 wherein the photocathode layer is of a material having a work function, which is lower than the photon energy of said radiation beam.

6. (Original) The apparatus as claimed in Claim 1 wherein the photocathode layer is of CsI or an earth metal.

7. (Currently Amended) The apparatus as claimed in Claim 1 wherein the photocathode layer is provided with a protective layer, said protective layer being transparent to electrons; and the photocathode layer ~~is adapted to~~ releases photoelectrons through said protective layer.

8. (Original) The apparatus as claimed in Claim 7 wherein the protective layer is opaque to light.

9. (Previously Presented) The apparatus as claimed in Claim 8 wherein the protective layer is provided with a thin layer, which is transparent to electrons and opaque to light.

10. (Cancelled)

11. (Amended) The apparatus as claimed in Claim 1 wherein the radiation entrance is arranged such that the beam of radiation ~~can be entered~~ enters into the apparatus and ~~can~~ impinges on said photocathode layer at a grazing angle α, which is lower than 500 mrad.

12. (Original) The apparatus as claimed in Claim 1 wherein the radiation entrance is provided with a window, which is transparent to said radiation beam.

13. (Original) The apparatus as claimed in Claim 1 comprising a collimator arranged in front of said radiation entrance.

14. (Original) The apparatus as claimed in Claim 1 wherein the electron avalanche amplifier includes an array of avalanche amplification regions filled with an avalanche amplification medium.

15. (Original) The apparatus as claimed in Claim 14 wherein the avalanche amplification medium is a gas or a gas mixture.

16. (Original) The apparatus as claimed in Claim 14 wherein the avalanche amplification medium is a liquid.

17. (Original) The apparatus as claimed in Claim 14 wherein the avalanche amplification medium is a solid.

18. (Original) The apparatus as claimed in Claim 14 wherein the individual avalanche amplification regions are separated from each other by a dielectric.

19. (Original) The apparatus as claimed in Claim 1 wherein the electron avalanche amplifier includes an avalanche cathode and an avalanche anode arrangement, respectively.

20. (Original) The apparatus as claimed in Claim 19 wherein the avalanche cathode is permeable to electrons.

21. (Original) The apparatus as claimed in Claim 19 wherein the avalanche anode and readout arrangements are comprised of a single arrangement.

22. (Original) The apparatus as claimed in Claim 1 wherein the readout arrangement includes an array of readout elements.

23. (Currently Amended) The apparatus as claimed in Claim 1 wherein the radiation entrance is arranged such that a planar radiation beam ~~can be entered~~ enters into the apparatus through said

radiation entrance and ~~can~~ impinges on said photocathode layer at grazing incidence; and the read-out arrangement is arranged such that electron avalanches derivable mainly from absorption of transversely separated portions of said planar radiation beam are separately detectable.

24. (Original) An arrangement for use in planar beam radiography, said arrangement comprising an X-ray source, means for forming an essentially planar X-ray beam located between said X-ray source and an object to be imaged, and the detector as claimed in Claim 1 located and arranged for detection of the planar X-ray beam as transmitted through or reflected off said object.

25. (Previously Presented) A method for detection of radiation in a detector apparatus comprising a radiation entrance, a photocathode layer, an electron avalanche amplifier, and a readout arrangement, said method comprising the steps of:

- introducing a beam of radiation into the detector apparatus through said radiation entrance such that said radiation beam impinges on a first surface of said photocathode layer at grazing incidence, wherein photoelectrons are released from said photocathode in response to said impinging radiation beam;

- avalanche amplifying the photoelectrons released from said photocathode layer by means of said electron avalanche amplifier; and

- detecting the avalanche amplified electrons by means of a readout arrangement, wherein

- said radiation beam is introduced into the apparatus between said photocathode layer and said electron avalanche amplifier; and

- the photoelectrons, which are avalanche amplified and subsequently detected, are released from the first surface of said photocathode layer.

26. (Cancelled)

27. (Cancelled)

28. (Original) The method as claimed in Claim 25 wherein the introduced radiation beam comprises photons having a photon energy, which is higher than the work function of the photocathode layer.

29. (Previously Presented) The method as claimed in Claim 25 wherein the beam of radiation is introduced such that it impinges on said photocathode layer at a grazing angle α, which is lower than 500 mrad.

30. (Previously Presented) The method as claimed in Claim 25 wherein the photoelectrons are avalanche amplified in an array of avalanche amplification regions filled with an avalanche amplification medium.

31. (Original) The method as claimed in Claim 25 wherein a planar radiation beam is introduced into the apparatus through said radiation entrance such that it impinges on said photocathode layer at grazing incidence; and electron avalanches derivable mainly from absorption of transversely separated portions of said planar radiation beam are separately detected by means of said read-out arrangement.

32. (Previously Presented) The apparatus as claimed in Claim 9 wherein said thin layer, which is transparent to electrons and opaque to light, is a metallic layer.

33. (Currently Amended) The apparatus as claimed in Claim 1 wherein said radiation entrance is arranged so that the beam of radiation can be entered into the apparatus and can impinge on said photocathode layer at a grazing angle α, which is in the interval 0.05-500 mrad.

34. (Previously Presented) The apparatus as claimed in Claim 1 wherein said radiation entrance is arranged so that the beam of

radiation can be entered into the apparatus and can impinge on said photocathode layer at a grazing angle α, which is in the interval 0.50-50 mrad.

35. (Currently Amended) The method as claimed in Claim 25 wherein said beam of radiation is introduced so that said beam of radiation impinges on said photocathode layer at a grazing angle α which is in the interval 0.05-500 mrad.

36. (Previously Presented) The method as claimed in Claim 25 wherein said beam of radiation is introduced so that said beam of radiation impinges on said photocathode layer at a grazing angle α, which is in the interval 0.50-50 mrad.

37. (Previously Presented) The method as claimed in Claim 25, wherein any light photons emitted in the detector apparatus are prevented from reaching the photocathode by means of a metallic layer, which is opaque to light.

38. (Previously Presented) The method as claimed in Claim 37, wherein said layer preventing any light photons emitted in said detector apparatus from reaching said photocathode is a metallic layer.

39. (Previously Presented) The method as claimed in Claim 25, wherein the photoelectrons are avalanche amplified in an array of avalanche amplification regions filled with an avalanche amplification medium.

40. (Previously Presented) The method as claimed in Claim 39, wherein said avalanche amplification medium is a gas or gas mixture.

41. (Previously Presented) The method as claimed in Claim 25, wherein a planar radiation beam is introduced into the apparatus through said radiation entrance such that it impinges on said photocathode at grazing incidence; and electron avalanches derivable mainly from absorption of transversely separated portions of said planar radiation beam are separately detected by means of said read-out arrangement, which includes an array of readout elements.

42. (Previously Presented) The method according to claim 30, wherein the avalanche amplification medium is an ionizable gas